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Research For Marine Mammal Mitigation

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LONG-TERM GOALS

The long-term goal of this effort is to assist ONR in complying with environmental regulations with respect to the potential impact of underwater acoustic signals on marine mammals.

OBJECTIVES

The objectives of this effort are to develop and maintain a unique database integrating all ONR-pertinent environmental compliance documentation and test results and to provide assistance and recommendations regarding environmental compliance process, including mitigation.

APPROACH

Efforts have focused on updating the database, identifying emerging environmental compliance issues and investigation the use of technology to improve mitigation.

WORK COMPLETED

Additional scientific studies contributing to understanding the potential effects of underwater acoustics on marine mammals were reviewed and added to the database. Improved MATLAB-based AIM© data analysis algorithms were developed to estimate potential energy level exposures of marine mammals resulting from as-sea experimentation using acoustic sources. Completed a study of existing digital technology to assist visual marine mammal detection to improve mitigation. Competed and received approval for a plan of action to acquire and test new generation of digital infrared cameras for marine mammal detection. Acquired equipment and completed integration in preparation for at-sea testing in October 2005.

RESULTS

A study of existing, next generation digital infrared camera technology has shown that IR camera could be used for automated or cued detection of small marine mammal to mitigation the operation of LAMP-like autonomous sources to range less than 200 meters. Next generation IR cameras have the ability to detect very small temperature differences, but very little has been published about the use of IR cameras for marine mammal detection. Therefore the results of this study must be tested at-sea. Limitation of IR technology for marine mammal detection were identified to include the unknown amount of heat energy transferred from the marine mammal (through fat insulation and water on the skin) into the air, and field-of-view limitation. These limitations will be tested at-sea in October 2005

IMPACT/APPLICATIONS

Compliance with environmental policy is required by U.S. law and by DoD, DoN, OPNAV, and ONR regulations. Research conducted under this effort assists ONR personnel in their efforts to comply with these various regulations.

IR detection of marine mammals will assist mitigation the operations of autonomous source planned to be operated by ONR in the LAMP and DWADS programs in 2007 and beyond. Additionally, IR detection of marine mammals could replace the labor (and cost) intensive visual observers currently used by ONR in the LWAD sea test program.

TRANSITIONS

The results of research done under this task are being used in the preparation of environmental compliance documentation for several ONR programs including the Littoral Warfare Advanced Development (LWAD) program and various Ocean Acoustics projects. If proved effective, electronic visual mitigation techniques will also be integrated into future ONR at-sea acoustic testing.

RELATED PROJECTS

Models, databases, and techniques developed under this task are applicable to all at-sea acoustic testing by ONR Code 32.

PUBLICATIONS

Plan of Action to Conduct Preliminary Testing of Infrared (IR) Cameras for Automated Marine Mammal Detection, Technical Report, 8 March 2005